INTRODUCTION

Problems to deal with in Afghanistan are: Poor patients and hospital hygiene, drug corruption, high rate of antibiotic resistance, counterfeit antibiotics, absence of lab proof of germs associated with antibiotics.

Afghanistan is in need of an antibiotic tissue regeneration promoter for intra- and postoperative topical use to deal with frequent bone & soft tissue infections in orthopaedic surgery. O₂-enriched pharmaceutical chloride (NaClO₂, German Drug Codex DAC N-055, 1990; Oxoferin® registered in 1983) contains NaClO₂ which releases potent disinfectant ClO₂ at pH 6 (225 ppm) cheaper than antibiotics with no development of resistance.

METHODS AND PATIENTS

Descriptive phase V study conducted in the former Military Hospital in Mazar 2004 – 2005 with 26 patients (22 chronic osteomyelitis, 2 septic arthritis, 2 open fractures, 1 diabetic foot ulcer) to determine whether "the therapeutic effect of the German official drug DAC N-055 is realized also in day-to-day clinical practice in Afghan surgery“ and to familiarize ourselves with this official drug first registered as finished drug (Ossoferin®) in Germany in 1983

4.5% DAC N-055 was diluted 1:100 in physiological saline or Ringer-Lactate Buffer prior to use and administered as follows:

- repeated intra-operative field rinsing
- post-op. irrigations (closed and later open) into the bone cavity
- intra-articular irrigations (4x per day) (joints with drain!)
- moist wound dressings (cotton gauzes moistened with drug 0.045% DAC N-055 in 0.9% NaCl)

Here we document 6/26 cases in more detail:

RESULTS with 0.045% Na-chlorosum

11/22 osteomyelitis cases could be monitored 5 to 18 months. 6/11 cases not treated with open bone cavity irrigations relapsed with sinususes within this period. For 8/11 patients antibiotics had not been available.

Without antibiotics, both septic arthritis cases had an excellent functional outcome after 6 weeks.

The open fracture with skin defect received mesh graft on excellent granulation after 1 month and was completely closed after 3 months.

The mal perforans of the diabetic foot could be closed within 50 days but reopened after 2 years in the absence of anti-diabetic medication.

DISCUSSION

For septic arthritis, the "initial continuous irrigation phase" of the drip with 16 drops per minute 0.045 % sodium chlorosum in Ringer lactate buffer can be expanded for >4 days.

"Discontinuous cavity injection" with a special tube allowing an interval drainage should be tried: After an initial irrigation phase of 24 hours, the cavity is filled and the wound exit tube is only opened at intervals of several hours to be refilled after evacuation (see Figure 1). For chronic osteomyelitis treatment the subsequent discontinuous phase (instillation of 2 x 50 ml per day) should be expanded for an additional week with a lower concentration (25 µM instead of 5000 µM = 0.045%) for BM reconstitution. At this concentration Na-chlorosum has stimulated BM regeneration after 12 Gy lethal gamma irradiation in rodents (Ivanovski, S. and S.R. Kemppi, "Regenerative effects of TCDO in BD IX rats after total-body gamma irradiation" Radiat. Res., 115 (1): 115-123, 1988).

CONCLUSION

Peroxyl-chlorohate in Na-chlorosum has 3 chemical pathways.

Pathways (1) and (3) fight infection (1) and stimulate tissue regeneration (3) and should be further exploited in bone cavity drips after surgical intervention in chronic osteomyelitis.

(1) OClO₂⁺ + H₂O → 2 ClO₂⁻ + H₂O + 2 ClO₂⁻ (pH=6)

(2) OClO₂⁻ + hν → O₂ + 2 ClO₂⁻ (366 nm)

(3) 2 ClO₂⁻ + 2 H₂Fe(III) → 4 Cl⁻ + 2 Fe(II) + 2 ClO₂⁻ (pH 7.4)

NaClO₂: heme-Fe(III)→O porphyrin n-cation radical